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(54) Title: MICROFLUIDICS DEVICES AND METHODS FOR PERFORMING CELL BASED ASSAYS

(57) Abstract: This invention provides methods and apparatus for performing microanalytic analyses and procedures, particularly miniaturized cell based assays. These methods are useful for performing a variety of cell-based assays, including drug candidate screening, life sciences research, and clinical and molecular diagnostics.

MICROFLUIDICS DEVICES AND METHODS FOR PERFORMING CELL BASED ASSAYS

BACKGROUND OF THE INVENTION

This application claims priority to U.S. Provisional Application Serial No. 60/204,264, filed May 15, 2000, the disclosure of which is explicitly incorporated by reference herein.

1. Field of the Invention

This invention relates to methods and apparatus for performing microanalytic analyses and procedures. In particular, the present invention provides devices and methods for the performance of miniaturized cell based assays. These assays may be performed for a variety of purposes, including but not limited to screening of drug candidate compounds, life sciences research, and clinical and molecular diagnostics.

2. Background of the Related Art

Recent developments in a variety of investigational and research fields have created a need for improved methods and apparatus for performing analytical, particularly bioanalytical assays at microscale (*i.e.*, in volumes of less than 100 μL). In the field of pharmaceuticals, an increasing number of potential drug candidates require assessment of their biological function. As an example, the field of combinatorial chemistry combines various structural sub-units with differing chemical affinities or configurations into molecules; in theory, a new molecule having potentially unique biochemical properties can be created for each permutation of the sub-units. In this way, large libraries of compounds may be synthesized from relatively small numbers of constituents, each such compound being a potential drug lead compound of usually unknown biological activity and potency. Similarly, increasingly large numbers of targets for these putative therapeutic compounds are being discovered, many as a result of the growing information derived from such large-scale biological research as the sequencing of the human genome.

As the first phase of drug discovery, compounds that represent potential drugs are screened against targets in a process known as High Throughput Screening (HTS) or ultra-High Throughput Screening (uHTS). An advantage of these screening